

ABSTRACT

A membrane electrode assembly comprising a composite membrane having a first major surface area and a second major surface area comprising a porous polymeric matrix containing ionically conductive solid and ionomer binder, at least one protective layer disposed adjacent to the porous polymeric matrix membrane comprising an ionomer binder and an ionically conductive solid, an anode comprising an oxidizing catalyst adjacent said first major surface area of said composite membrane and a cathode comprising a reducing catalyst adjacent said second major surface area of said composite membrane, and a method for manufacturing the same.